# Second policy report

Smart CulTour

Smart Cultural Tourism as a Driver of Sustainable Development of European Regions

Deliverable

D1.3

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 870708

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# Abstract

This report serves as deliverable D1.3 of the SmartCulTour Horizon 2020 project (grant agreement number 870708) which is aimed at supporting regional development in all European regions with important tangible and intangible cultural assets, including those located in rural peripheries and the urban fringe, through sustainable cultural tourism. This report aims to provide an overview of the specific policy recommendations that originate from two particular tasks in the SmartCulTour project: conceptualization, indicator selection, and measurement of composite indices in order to assess the state of the destination with regard to (cultural tourism) sustainability and resilience (WP4) and development of decision-support systems to assist local stakeholders in knowledge-based decision-making (WP5).

Even though widely references in hundreds of articles, the concept of sustainability remains ill-defined and therefore impractical. In order to focus on sustainability aspects of cultural tourism, it is necessary to properly define a framework of appropriate and measurable indicators that can be tracked across time and space and fully encompass the multidimensional nature of the concept. In this policy report, attention will thus be paid to the operationalization of the concept of sustainable and resilient cultural tourism through the selection of indicators that can be collected longitudinally on local (ideally Local Administrative Units) level.

Secondly, advantages of cultural tourism and its more sustainable nature – as opposed to other forms of (mass) tourism – are often implied but, as noted by the Cultural Heritage Counts for Europe Consortium (2015) report, lack comprehensive evidence. Via D4.2 of the SmartCulTour project (Petrić et al., 2021), the proposed relationship between cultural tourism development, destination sustainability, and resilience was empirically tested and the methodology as well as main findings and learnings are presented here.

Finally, indicator collection is, in itself, only a first necessary step towards knowledge-inspired destination management. Therefore, inspired by D5.2 (Bertocchi et al., 2021a) of the SmartCulTour project, we discuss the potentials and best practices of decision-support systems to help visualize, compare and contrast destination-specific information for advanced tourism policy-making.

At the end of the report, a number of policy recommendations are given on the topics of indicator selection and collection for sustainable tourism destinations, the link between cultural tourism, sustainability, and resilience, and the creation of robust and modular decision support systems, specifically:

- The need to adopt a communal core set of sustainability indicators, preferably following the standards set out by the European Tourism Indicator System;
- Supporting data collection, establishing the contribution of the tourism sector in destination impacts via additional dedicated research, and improving the speed of data availability by advocating the use of open data standards;
- Limiting participative stakeholder integration to indicator trimming, instead of adopting participatory approaches at the earliest stage of indicator selection;

- Adopting generally accepted definitions for cultural tourism development and resilience – as well as sustainability – in order to support continuous indicator measurement and the empirical identification of relationships;
- Adopting both quantitative and qualitative approaches to the study of resilience in order to allow for integration of 'built back better' ideas;
- Integration of systems dynamics in decision support systems to allow for scenario analysis and cause-effect modelling;
- Provision of a general underlying data architecture at higher (preferably EU level) on which local destinations can build sustainable destination dashboards.

# Contents

# 01 Introduction

## 1.1. Sustainability in tourism research and policy

The discussion on sustainable cultural tourism, its dimensions, indicators and visualization approach, cannot be seen indepedently from the progress made in the general field of sustainability-related research. Indeed, (cultural) tourism, is just one field within the broader societal sphere where the concept of sustainability has received increased attention. Since its integration into the mainstream discussion by the time of the 'Limits to Growth' report of the Club of Rome and the 'Our Common Future' report of the Brundlandt-commission (World Commission on Environment and Development, 1987), within different spheres, sectors, and even individual businesses, the concept of 'sustainability' has been interpreted and measured in a variety of ways. The general defintion adopted by the Brundlandt-commission as development that meets the needs of the present without compromising the ability of future generations, and its conceptualization in the three-pillar approach of economy, environment and the socio-cultural dimension still leaves ample room for interpretation depending on stakeholder interests.

On destination level, the 'cautionary platform' in tourism research, which focused concerns on potential negative impacts of tourism, already entered the discussion since the mid-1960s (Jafari, 2001), when international tourism arrivals were still at about 112.8 million (83.7 million of which took place in Europe) (Our World in Data, n.d.). At this point in time, sociological and anthropological studies were mainly interested in potential socio-cultural changes through the host-guest relationship (e.g. Cohen, 1979; Doxey, 1975, MacCannell, 1976). During the 1980s – a period when international tourism increased further from 278.1 million arrivals worldwide in 1980 (178.5 million in Europe) to 439.4 million in 1990 (265.6 million in Europe) (Our World in Data, n.d.) – negative impacts started to become more evident in certain mass destinations, threatening the industry's long-term viability and image and being reflected in Butler's (1980) Tourism Area Life Cycle Model warning for potential stagnation or decline in destinations withour proper long-term development policies. Saarinen (2006) notes that while there had thus been earlier discussions on the limits to growth in tourism, the publication of the Brundtland Commission's report in 1987 led to a popularization of the notion of sustainability as a central theme within the tourism policy discourse, taking it out of the purely academic sphere and into the public forum.

Broadly speaking, Swarbrooke (1999, p.13) provides a generally accepted definition for sustainable tourism: "tourism which is economically viable but does not destroy the resources on which the future of tourism will depend, notably the physical environment and the social fabric of the host community". However, much like the general definition of sustainable development being troubled by vagueness and operational limitations, similarly the idea of sustainability of tourism has invited criticisms and led to practical problems, particularly in relation to the holistic nature of sustainability and its global-local scale. In effect, while impacts of tourism are increasingly global in nature, the focus of analysis has mainly been on the more local destination scale (Saarinen, 2006). While this is sensible, since many of the most important impacts are felt within local communities, a failure to account for the globalized nature of effects can minize important negative impacts. Moreover, the antropocentric nature of the definition, placing economic viability central, leaves room for interpretation, particularly in terms of what it means to "destroy" the resources on which

future tourism depends. Saarinen (2006) outlines how different research traditions on limits to growth provide alternative explanations on acceptable changes. Neuts (2016) furthermore links these research traditions in sustainable development to the five capitals approach behind the economic concept of wealth creation. The five capitals approach starts from the idea that an organization uses five types of capital to deliver products or services: natural, social/institutional, human, financial and manufactured capital. The activity-based tradition is then more industry-oriented and implies limits to growth as set by the tourism sector and economic optimization within. It is a weak, non-conservationist view on sustainable development whereby substitution between production capitals is allowed as long as the total stock of capitals increases or is maintained at a status-quo. In comparison, the resource-based tradition defines the limits to growth on the basis of the most sensitive destination resource – most often the natural environment – and adopts a strong, conservationist view on sustainable development in which capitals substitution is generally not accepted and sustainable solutions require at minimum a status quo in the level of all production capitals. Finally, the community-based tradition is based on democratic principles whereby the norms of local community stakeholders define limits of acceptable change and the extent to which production capitals are considered interchangeable.

Therefore, even though the general philosophy is simple enough to understand, the undefined nature has led to a situation in which sustainability has often been used more as a buzzword and branding tool in policies and strategies than as a truthful endeavour to attempt to achieve. As mentioned by Mihalic (2020), even though sustainability-thiking has found traction within the tourism discourse of nearly every destination by now, practical implementation has been slow and most destinations have, in effect, continued to rely on an economic growth model. Other researchers are even more negative in their perceptions, with Wheeller (1993, p.121) asserting that the "'intellectually appealing' theoretical concept of sustainable tourism has little practical application … allowing essentially the same behaviour as before", and Buckley (2012) and Higgins-Desbiolles (2010) stating that tourism practices are not yet close to being sustainable or even alarmingly unsustainable.

In the decade since the publications of Buckley (2012) and Higgins-Desbiolles (2010), there had been a growing concern in both popular press as in policy and academia over the negative impacts of tourism, generally framed under the concept of 'overtourism' (a popularized term introduced as recently as 2016). The seemingly unsustainable growth of tourism in places such as Barcelona, Berlin, Venice, Dubrovnik, Amsterdam, and others, centred around the concerns of residents in these cities and saw a significant number of local and national Destination Management Organizations change strategy from focusing on tourism as a growth strategy, to seeing tourism as a means towards a higher-level goal of local quality of life. Notwithstanding, local policies are naturally limited to the extent at which they can influence visitor flows within an industry that is largely privatized and decentralized. When Covid-19 hit society in general, and the tourism sector in particular, leading to a massive drop of over 70% in international tourism arrivals in 2020 (UNWTO, 2021), many authors saw this as an opportunity to 'build back better' and rethink tourism (e.g. Goretti et al., 2021; Jeyacheya & Hampton, 2022, Sharma et al., 2021). However, recent empirical observations seem to suggest very little long-term change in the perspectives of industry and visitors (European Travel Commission, 2022a; Tauber & Bausch, 2022), with demand in Europe already reaching 70% of pre-pandemic levels again in 2022 (European Travel Commission, 2022b).

## 1.2. Scope and objectives of the policy report

In the first policy report of the SmartCulTour project, it was mentioned how cultural tourism is by all means of estimation a sizeable portion of domestic and international tourism. Apart from the visitor quantity, cultural tourism – or at least certain segments of cultural tourism – often uses resources that are more vulnerable to overuse, be it natural heritage areas or historic buildings and sites. As such, the sustainability of cultural tourism and cultural tourism resources is an important research topic. At the same time, cultural tourism is often seen as a qualitatively prefered type of tourism, with the potential to contribute more to the local destination, both in terms of income as in terms of socio-cultural interaction. Such potentials should also be identified, mapped and interpreted.

As the discussion under heading 1.1 mentions, the concept of sustainability remains ill-defined and therefore impractical. In order to focus on sustainability aspects of cultural tourism, it is necessary to properly define a framework of appropriate and measurable indicators that can be tracked across time and space and fully encompass the multidimensional nature of the concept. While, ideally, such an approach would also set standards for indicator, within a 'limits to growth' philosophy, this is not attempted in this policy report. The reason for the omission is twofold: (a) setting such standards or thresholds would imply an understanding of the causality of relationships and this requires at the very least longitudinal and cross-sectional datasets, and (b) limits are at least to some extent normatively defined and unquantifiable. Therefore, we remain more interested in the process used for identifying priority indicators, the indicator selection itself, and tracing changes through time as a means to provide information that is then to be interpreted by communities, academics and policy-makers to support knowledge-led decision-making.

In this policy report, attention will thus be paid to the operationalization of the concept of sustainable and resilient cultural tourism through the selection of indicators that can be collected longitudinally on local (ideally Local Administrative Units) level. Via D4.2 of the SmartCulTour project (Petrić et al., 2021), these proposed indicators were also tested in terms of their relationship with general sustainability concepts. Secondly, indicator collection is, in itself, only a first necessary step towards knowledge-inspired destination management. Therefore, inspired by D5.2 (Bertocchi et al., 2021a) of the SmartCulTour project, we discuss the potentials and best practices of decision-support systems to help visualize, compare and contrast destination-specific information for advanced tourism policy making.

# 02 Indicators for sustainable cultural tourism

## 2.1. The process of indicator creation

### 2.1.1. Stakeholder integration in indicator-selection

Within the field of tourism, the United Nations World Tourism Organization has been supporting the development and application of indicator frameworks for sustainability of tourism destinations since the early 1990s, with a comprehensive guidebook on baseline and additional indicators being published in 2004 (UNWTO, 2004). The guidebook explicitly states the importance of destination-specific indicator selection through stakeholder consultation, or as defined in the UNWTO (2004, p.7) guidelines: "Sustainable tourism development requires the informed participation of all relevant stakeholders, as well as strong political leadership to ensure wide participation and consensus building." Tanguay et al. (2013) narrow down this approach to a distinction between scientific selection and political concensus in indicator selection. As observed by these authors, as well as Font et al. (2021), indicator sets proposed through academic research often seek to obtain a large amount of – often unavailable – data that are too complex to be adopted by policy-makers, while consensual indicators through a participatory approach tend to encourage a condensing and simplification of information but are at risk of being subjective and exploited for territorial branding purposes. Research has therefore indicated that indicators established through a purely scientific approach often fail to gain legitimacy among policy-makers, while politically-motivated indicator selection can favour participation of larger stakeholders and thus introduce bias (Hunter, 1997; Rametsteiner et al., 2010; Tanguay et al., 2013).

Tanguay et al. (2013) therefore suggest two sets of selection criteria – consisting of seven total criteria – with the primary set identifying a concise list of scientifically valid indicators and secondary criteria facilitating integration with the relevant policy framework at the destination:

1. Classification: Based on the available literature and previous research on sustainability indicators, all indicators are distinguished according to their main dimension (environmental, social, economic) and/or intersections of dimensions.
2. Frequency of use: Based on selected case studies, the most frequently used sustainable tourism indicators among the initial list are identified. While frequency of use risks omitting less used but relevant indicators, it allows for a selection that is practically tested.
3. Coverage of the main issues in tourism sustainability: The reduced list of indicators from step 2 is compared to the main issues in sustainable development[1] in order to ensure minimal coverage of each sustainability component.

[1] The authors recognize 20 issues, also based on the UNWTO (2004) guidebook: ecosystem, water, atmosphere, energy, waste, landscapes and nuisance, resilience and risk, security and safety, health, satisfaction, public participation, culture, accessibility, investments, promotion of ecotourism, economic vitality, employment, marketing,

4. Measurability over time: As an operational necessity, since sustainable tourism indicators are often meant to measure evolutions, only indicators are retained that are dynamic.
5. Availability of data: The fifth step supplements the previous general criteria with location-specific analysis and requires a judgement whether or not the proposed list of indicators is available for the destination being studied. If not, alternatives for such indicators would need to be sought at local level.
6. Compatibility with destination tourism policy: To ensure both academic relevance and political update, the remaining indicators then need to be analyzed against the tourism policy framework of the destination being studied.
7. Validation of indicators by decision makers: Finally a consensual validation of the proposed sustainable tourism indicators by decision makers and other stakeholders ensure a common acceptability.

It is clear that the authors see sustainable development indicator selection as a primary scientific subject, with steps 1 through 4 serving to select a scientifically valid, multidimension, and limited set of relevent indicators. At this stage, these indicators can be considered universal. The final three steps then serve to link the universal set of indicators to place-specific needs, particilarly from policy and wider stakeholder perspective. Interestingly, in the selection of relevant indicators, The European Tourism Indicator System (ETIS) followed a similar process, namely: the initial set of relevant indicators was based on expert judgement by a Tourism Sustainability Group consisting of public and private sector experts in sustainable tourism. Its feasibility was then tested in two pilot phases across numerous destinations, allowing for a revision of the system. As outlined in the ETIS-manual, awareness-raising and stakeholder engagement is crucial, but this is linked to the implementation phase, not the indicator designation phase (European Commission, 2016).

This view is rather different from the indicator development procedure outlined in the UNWTO handbook (UNWTO, 2004) where the participatory process is highlighted as the second step, right behind the identification of the destination scope. In their approach, destination stakeholders are to be included in the initial phases of indicator selection already, identifying tourism assets and risks, creating a long-term vision for the destination, selecting priority issues and using that as a basis for an identification of desired indicators. While such an approach allows for meritocracy in indicator development, it runs into potential issues and risks. First of all, as UNWTO (2004) mentions themselves, it cannot be assumed that all stakeholders are equally motivated and invested to participate, which could lead to a situation in which the discussion is dominated by lobby groups with more vested economic interests. Secondly, sustainability is a complex and conceptually broad topic that is not easily operationalized at practical level. While participative approaches are commendable, value of expertise should also be considered and it cannot be readily assumed that a wide selection of stakeholders holds sufficient background knowledge on destination-level sustainable development issues. Thirdly, and partly linked to the previous observation, starting from a participatory approach rather than scientifically valid indicator selections invites purely destination-level thinking, instead of universal thinking. This would lead to heterogeneous indicator selections for different locations. While destination-unique indicators have an important value, there ought to be a minimum level of consistency and comparability.

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reputation, and traffic.

### 2.1.2. General and location-specific approaches

As mentioned under heading 2.1.1, and also discussed by Tanguay et al. (2013) and Font et al. (2021), while unique indicators per region can be legitimized by the uniqueness of cases, there also should be a minimal level of consistency and comparability in indicators in order to (a) avoid manipulation of the sustainability concept, (b) reduce the risk of missing sustainability dimensions, and (c) encourage comparability between regions. Furthermore, there are generally consensual baselines of sustainability that are true for each destination (e.g. level of tourist pressure and density, local resident perceptions towards tourism, share of tourism employment, $CO_2$ emissions, water usage). While their threshold value – i.e. the value above/below which an indicator is seen as potentially problematic – might differ and be locally defined, the act of measuring these indicators on an absolute level ought to be universally attempted.

Such an approach has been followed in ETIS (European Commission, n.d.) as well as in the UNWTO (2004) guidebook on sustainable tourism indicators. Both propose a set of key – universal – indicators, accompanied by additional variables to be collected depending on site-specific needs (e.g. coastal destinations, mountainous regions, cultural destinations). The understanding here is that there are a number of key concepts which are central and uncompromising for the measurement of sustainable destinations, while additional context-specificity needs to be accommodated for.

A related but somewhat difference distinction can be made regarding the level at which indicator systems are to be used. Most often a destination-level perspective is adopted but even here the definition of destinations can vary from national level to regional level (e.g. NUTS2, NUTS3) or specific destinations. Indicator systems are most often found at NUTS1 level – such as the UNWTO Tourism Data Dashboard (UNWTO, n.d.), the European Travel Commission's initiative on measuring sustainable tourism indicators across ETC member countries (although the data collection also incorporates information on main cities/regions), and many local initiatives like the Dutch (Nederlands Bureau voor Toerisme & Congressen, n.d.) and Flemish (Toerisme Vlaanderen, n.d.) tourism dashoards. The prevalence of national-level dashboards can partly be related to governance structures, availability of funding and expertise at these levels of policy, and data availability. While national data is important and, particularly for smaller countries, there might not be that much added value in collecting certain variables at lower administrative levels due to their relative lack of variance (e.g. financial ratios in tourism subsectors, $CO_2$ emissions per subsector/trip), other important tourism impacts can be very place-and/or time-specific and national-level aggregation does not sufficiently account for local differences (e.g. local resident perceptions towards tourism, share of tourism employment). Such impacts highlight a necessity for indicator systems on NUTS3 level. However, as can be seen from the availability of Eurostat statistics on tourism, there is still a relative lack of data on lower administrative levels, therefore either leading to large numbers of missing variables or high costs of data collection. As a result, while NUTS3-level tourism indicator systems do exist in larger destinations, they are often comprised of locally-relevant data and generally lack a more common framework in comparison to national-level initiatives.

Another level at which indicator systems are often in use – albeit less visible to the general public – are tourism companies, particularly but not exclusively larger accommodation providers and transportation companies, where indicators serve to assist the strategic planning process and management by objectives. These systems take the form of Key Performance Indicators (KPIs) and the degree to which they allign with sustainability priniciples will depend on the level of uptake of sustainable thinking within these specific companies. While not the focus of this policy report, business literature on sustainable business models

(Bae & Smardon, 2011), and the Future-Fit Business Benchmark (F2B2) (Kurucz et al., 2017) are exemplary of enterprise-level thinking on measurement and evaluation of business processes within a wider sustainability concern.

### 2.1.3. Indicator types and measurement

UNWTO's (2004) guidebook recognizes six indicator types: (a) early warning indicators (e.g. decrease in percentage of tourists intending to return), (b) indicators of stresses on the system (e.g. crime rate, water use), (c) measures of current state of the tourism industry (e.g. occupancy rates, tourist satisfaction), (d) measures of management efforts (e.g. public spending on culture and the environment), (e) measures of the impact of tourism development on the biophysical and socio-economic environment, and (d) measures of management effects, results or performance. While all six indicator types can be valuable, clearly the latter two require a proven causal link between tourism development/management and specific impacts. In reality tourism often takes place in a complex system with many additional external influences, making it increasingly difficult to establish direct causal effect of tourism development. As a result, indicator systems primarily focus on the first four types of indicators.

A second distinction in indicators can be made according to measurement type, with the clearest difference being between quantitative and qualitative indicators. Quantitative indicators are always expressed numerically and can take the form of absolute numbers that express a total (e.g. total amount of $CO_2$ emissions), ratios that express a relationship (e.g. tourist arrivals per 1000 residents), and percentages. While quantitative data is relatively easier to come by and is more widely available via national and international statistical agencies such as Eurostat or the World Bank, they are insufficient when needing to account for all dimensions and tourism impacts in a complete sustainability framework. Qualitative (or normative) data is therefore needed as a supplement. While such data is ultimately often expressed numerically as well, the numbers merely serve to recode ordinal levels or categorical types. Qualitative indicators can relate to categorization (e.g. different accessibility labels, IUCN index of the level of protection of natural areas), normative characteristics often denoting the absence or existence of development plans, labelling programmes, zonal regulations, etc., and opinion-based indicators (e.g. information on visitor and resident satisfaction). While the former types of qualitative data can still feasibly be collected through some desk research, the latter type of opinion-based indicators requires a survey method and therefore quickly becomes expensive and cumbersome.

## 2.2. Four pillars for (cultural) tourism sustainability

### 2.2.1. Sustainable cultural tourism dimensions

In most traditional literature, sustainability has been approached as a balance between three dimensions: social, environmental, economic, also known as the three-pillar conception or, alternatively, the triple P's of people, planet, profit – with later conceptualizations reimagining the final P as prosperity to highlight a wider value framework than just direct economic profits. In their historical analysis of the theoretical foundations of the sustainability concept, Purvis et al. (2019) note how the three-pillar conception seems to have emerged gradually through critiques on the economic growth narrative and miss a rigorous theoretical description. Soon after World War II the urgent need for international efforts to aid development led to the notion of economic development as a rise in material well-being through the increase in international flows of goods and services, and growth in GDP per capita (Arndt, 1981). While

economic development thus became synonymous with economic growth, the late 1960s and early 1970s saw a rise in the modern environmental movement starting to question the environmental destruction caused by human activity, particularly in light of the growth-based economy. At the same time, it became increasingly evident that the growth-based development, while broadly increasing living standards in the West, also led to an increase in inequality. Authors such as Seers (1969) and Hirsch (1995) therefore argued that poverty, unemployment, and inequality provided better indicators for progress than economic growth, which in many cases proved to be a cause, rather than a solution, for such problems. Purvis et al. (2019) note how the 'Our Common Future' report, which called for "a new era of economic growth – growth that is forceful and at the same time socially and environmentally sustainable" (World Commission on Environment and Development, 1987, p. xii), effectively co-opted the social and environmental discourse and reinstituted economic growth as the potential solution in a win-win scenario and thus provided the basis for the well-known representation of sustainable development as three intersecting circles (although alternative representations do exist, as shown in Figure 1).

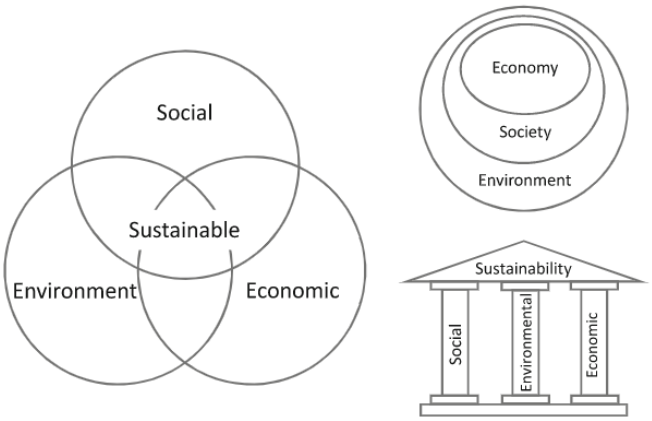


**Fig 1. Alternative representations of sustainability dimensions (Purvis et al., 2019, p.682)**

While the three pillars (or dimensions) are ubiquitous in sustainability literature, certain authors have proposed additional dimensions, such as institutional (Spangenberg et al., 2002; Turcu, 2012), technical (Hill & Bowen, 1997), and – most interesting for the SmartCulTour project – cultural (Soini & Birkeland, 2014). Furthermore, contemporary sustainability literature has – at times – veered away from the three-pillar approach and instead centred around the UN's diverse set of sustainable development goals (SDGs), which adopt 17 broad goals instead of a limited categorization across three dimensions. However, as also noted by the UN (2012), the three dimensions of sustainability were explicitly embedded in the formulation of the SDGs, making them part of the underlying rationale.

Narrowing the sustainable development topic to tourism, UNWTO's (2004) guidebook on sustainable development indicators does not explicitly refer to the pillars-approach but structures indicators according to 13 general topics: wellbeing of host communities, sustaining cultural assets, community participation in tourism, tourist satisfaction, health and safety, capturing economic benefits, protection of valuable natural assets, managing scarce natural resources, limiting impacts of tourism activity, controlling tourist activities and levels, destination planning and control, designing products and services, and sustainability of tourism operations and services. Each of these 13 topics can further be subdivided along multiple issues, 12 of which are considered baseline issues that can in turn be measured through various indicators. Table 1 provides an overview of topics, issues, and baseline issues. As analysed by Tanguay et al. (2013) – and also

implemented in Table 1 – these suggested topics and issues can quite conveniently be classified along the three (social, environment, economic) or five (social, environment, economic, institutional, cultural) pillars.

**Table 1. Sustainable tourism topics and issues (UNWTO, 2004)**

| Topics | Issues |
|---|---|
| Wellbeing of host communities | **Local satisfaction with tourism** (s), **Effects of tourism on communities** (s), Access by local residents to key assets (s), Gender equity (s), Sex tourism (s) |
| Sustaining cultural assets | Conserving built heritage (c) |
| Community participation in tourism | Community involvement and awareness (s) |
| Tourist satisfaction | **Sustaining tourist satisfaction** (s)(e), Accessibility (s) |
| Health and safety | Health (s), Coping with epidemics and international transmission of disease (s), tourist security (s), local public safety (s) |
| Capturing economic benefits from tourism | Tourism seasonality (e)(s), Leakages (e)(s), Employment (e)(s), Tourism as a contributor to nature conservation (e)(n), **Community and destination economic benefits** (e)(s), Tourism and poverty alleviation (e)(s), Competitiveness of tourism businesses (e) |
| Protection of valuable natural assets | Protecting critical ecosystems (n), Sea water quality (n) |
| Managing scarce natural resources | **Energy management** (n), Climate change and tourism (n), **Water availability and conservation** (n)(s), **Drinking water quality** (n) |
| Limiting impacts of tourist activities | **Sewage treatment** (n), **Solid waste management** (n), Air pollution (n), Controlling noise levels (n)(s), Managing visual impacts of tourism facilities and infrastructure (s) |
| Controlling tourist activities and levels | **Controlling use intensity** (s), Managing events (s)(c)(n) |
| Destination planning and control | Integrating tourism into local/regional planning (i), **Development control** (i), Tourism-related transport (i)(n), Air transport (i)(n) |
| Designing products and services | Creating trip circuits and routes (s)(e)(i), Providing variety of experiences (s), Marketing for sustainable tourism (s)(n), Protection of the image of a destination (i)(e) |
| Sustainability of tourism operations and services | Sustainability and environmental management policies and practices at tourism businesses (i)(s)(n)(e) |

*Note: Baseline issues in bold, (s) (c) (i) (n) (e) denoting social, cultural, institutional, environmental and economic dimensions, respectively*

The approach taken by ETIS is rather similar to UNWTO's guidebook and identifies 43 core indicators across four impact sections: destination management, economic value, social and cultural impacts, and environmental impacts. Thus, while avoiding the explicit notion of 'pillars', the impacts are quite clearly framed along institutional, economic, social, cultural and environmental dimensions as well.

Given the focus of the project on cultural tourism, it is considered useful to identify cultural sustainability as a separate dimension – although it could be considered that culture-specific indicators might be categorized under social and/or environmental dimensions as well. Therefore, for the sake of investigation the sustainability of cultural tourism destinations, we propose to follow a four-pillar strategy, building on familiar longstanding literature and adding the cultural dimension to the social, environmental, and

economic pillars. In the following part, the process of indicator selection, as well as the list of retained and suggested indicators per dimension, as analysed in SmartCulTour deliverables D4.1 (Petrić et al., 2020) and D4.2 (Petrić et al., 2021) is discussed.

### 2.2.2. Indicator groups per pillar

***Process of retained indicators***

As was discussed under heading 2.1, the process for indicator detection is influenced by the amount (and timing) of stakeholder engagement, the focus on general and/or location-specific indicators, and types and measurement attributes of indicators. Recognizing that there is already a wealth of literature on sustainable tourism indicators, an *ex ante* participative process with full stakeholder integration could be considered inefficient and potentially leading to incomplete (i.e. not covering all sustainability dimensions) or idiosyncratic indicators that are not readily generalizable. Instead, the SmartCulTour project follows Tanguay et al.'s (2013) process where a first selection is based on an academic systematic literature review, with an initial screening leading to over 500 retained indicators. In a next step, researchers of the main consortium partner selected 75 indicators to cover the four sustainability dimensions. Next, a panel of experts was asked to provide weights per indicator which could further establish inclusion or exclusion and serve to create composite variables or indices (see heading 2.2.3). Finally, the indicator lists then served to guide data collection across 35 local administrative units (LAUs) in six European countries (Belgium, Croatia, Finland, Italy, the Netherlands, and Spain), coinciding with the SmartCulTour Living Labs. Through this operationalization indicators were tested on policy relevance and availability, leading to a final proposed selection of 14 variables that could realistically be collected throughout European LAUs. The variables combine quantitative (absolute, ratio and percentage values) and qualitative indicators and focus on local destination level. Figure 2 gives a summarizing overview of the research process.

It is clear that there is still a large gap between the list of objectively valid and useful indicators on sustainable tourism destinations (between 46 and 75 indicators), and the final list of indicators that could currently be operationalized on the level of European LAUs (14 indicators). This is similar to the process of Tanguay et al. (2013) where the final set of indicators amounted to 20 variables – some of which could not be practically collected. Part of the data collection issue lies in the focus on NUTS3 regions, with more data being generally available for NUTS1 and NUTS2 regions. As such, the proposed list of 14 indicators is significantly smaller than the 43 core indicators proposed by ETIS. We also acknowledge that not all of the baseline issues as identified by UNWTO (2004) can currently be covered on LAU level. Still, the list below provides a feasible set of indicators that minimally covers the four pillars of a sustainable tourism destination and can hopefully be expanded when more data becomes available.

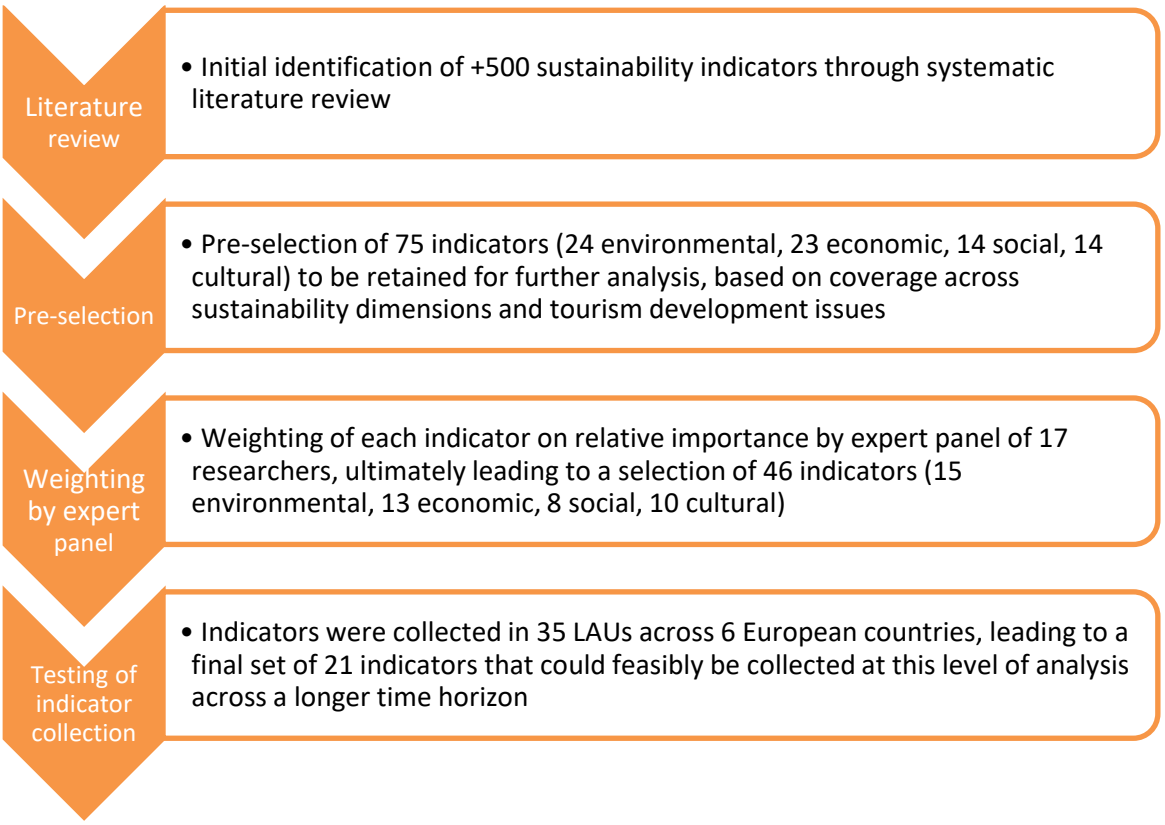


**Fig 2. Indicator selection process for sustainable cultural tourism destinations**

### *Environmental dimension*

The environmental dimension of sustainable tourism can be organized across nine impact fields: landscape and biodiversity protection, energy usage, water management, solid waste management, climate change, tourism development intensity, reducing transport impact, visitor perception, and resident perception. The initial impact fields proposed here are largely similar to the criteria proposed by ETIS (European Commission, 2016). However, while ETIS recognizes sewage treatment as important sustainability criteria, in cultural tourism destinations in Europe, such issue is less prevalent and instead D4.1 (Petrić et al., 2020) proposes the inclusion of visitor and resident perceptions on environmental impacts – in order to account for possible divergence between reality and perceptions – and the general tourism development intensity as a measure of spatial and temporal pressure on cultural tourism resources. The initial list after step 2 amounted to 24 environmental indicators[2], reduced to 15 indicators after expert selection. Table 2 provides an overview of considered indicators, as well as the final eight retained indicators that could feasibly be collected on LAU-level.

Information for two of the nine impact fields could not be collected in practice: the percentage of renewable energy consumption in total energy consumption by the tourism sector, and the water consumption attributable to tourism. Since tourism is a diverse sector that is not easily distinguished by sector codes – and detailed information by sector codes is also missing for water and energy consumption – these indicators are potentially interesting but currently unattainable. Furthermore, information related to visitor and resident perceptions, while possible, require dedicated data collection in the form of surveys or,

[2] For a full overview of these 24 indicators, see Petrić et al. (2020, p.85-86).

potentially, in the case of visitor perceptions, via scraping of online review platforms. In case of data collection via questionnaires, it is unlikely that such data will be available on annual basis.

**Table 2. Environmental indicators on LAU level**

| Impact field | Indicator | Retained at data collection |
|---|---|---|
| Landscape and biodiversity protection | **Completed impact assessment of environmental, social and cultural aspects of tourism (in terms of evaluating a tourism plan) (Yes/No)** | **Yes** |
| | Municipal expenses in environment per 1000 inhabitants | No |
| | Existence and functioning of a representative coordinating mechanism for MSP/ICZM (Yes/No) | No |
| | **Construction density per unit area** | **Yes** |
| Energy usage | Percentage of renewable energy consumption (Mwh) compared to overall energy consumption by the tourism sector | No |
| Water management | Water consumption attributed to tourism | No |
| Solid waste management | **Volume of waste generated** | **Yes** |
| Climate change | **$CO_2$ emissions per inhabitant** | **Yes** |
| Tourism development intensity | Total number of tourists per km² in key sites (crowding/spatial distribution) | No |
| | **Daily number of tourists per km²** | **Yes** |
| Reducing transport impact | **Accessibility of tourist attractions by public transport (Yes/No)** | **Yes** |
| | Number of embarked and disembarked passengers of cruise ships | No |
| | Number of embarked and disembarked passengers - Airport | No |
| Visitor perception | **Tourists' evaluation about destination cleanliness** | **Yes** |
| Resident perception | **Perceptions by the local population concerning environmental damage caused by tourism** | **Yes** |

### *Economic dimension*

The economic dimension is organized in five impact fields: tourism flows (volume and value) at the destination, tourism enterprise performance, quantity and quality of employment, sustainable tourism policy and planning, and visitor perceptions (or as labelled in the ETIS documentation: customer satisfaction). Again, the proposed fields are very similar to ETIS with one exception: ETIS additionally foresees in the inclusion of indicators on the tourism supply chain, represented as the percentage of locally produced food, drinks, goods and services sourced by the destination's tourism enterprises (European Commission, 2016). While undoubtedly of interest, particularly in order to understand potential leakages, such analysis is best performed within somewhat larger administrative regions since LAUs can hardly be expected to be self-contained. After the expert judgement of step 2 (see Figure 2), 13 indicators are proposed. In this policy document we furthermore add a 14$^{th}$ variable that originally dropped out in SmartCulTour D4.1 (Petrić et al., 2020) but which can be regarded as important in order to fully account for the diversity of economic impact fields. Table 3 provides an overview of these indicators, while also recognizing the four indicators that could ultimately be collected at this stage.

At the point of data collection, only two impact fields could partly be covered by available data: tourism flow (volume and value) at the destination, and sustainable tourism policy and planning. A main limitation

is the absence on site-or enterprise level data, while at the level of LAUs it is also not always possible to obtain monthly tourist arrival or overnight data – although this depends from country to country and is improving. Similarly, detailed data on tourist employment is lacking in many areas on detailed levels of analysis and indicators. We furthermore remark on the lack of data on visitor perceptions. While such information could feasibly be collected – albeit while incurring relatively significant costs for questionnaire collection – the data was not available within the SmartCulTour project since we operated under Covid-19 restrictions.

**Table 3. Economic indicators on LAU level**

| Impact field | Indicator | Retained at data collection |
|---|---|---|
| Tourism flow (volume and value) at destination | Average spending by tourists and excursionists | No |
| | **Average length of stay** | **Yes** |
| | **Total number of tourist arrivals** | **Yes** |
| | Number and origin of visitors to cultural sites per season (day, month, year) | No |
| Tourism enterprise performance | Ratio of low-season tourists to peak-season tourists (seasonality) | No |
| | Average occupancy rate for official tourism accommodation establishments | No |
| | Tourist revenues | No |
| Quantity and quality of employment[3] | Percentage of employees in the tourism sector relative to total employment | No |
| Sustainable tourism policy and planning | **Existence of up-to-date tourism plans and policies (Yes/No)** | **Yes** |
| | Existence of performance indicators designated for evaluating the tourism plan (Yes/No) | No |
| | **Existence of land use planning, including tourism** | **Yes** |
| | Public investment in tourism as percentage of total budget spent on tourism | No |
| Visitor perception | Global satisfaction level of tourists (destination) | No |
| | Evaluation of the price-quality relationship by tourists | No |

### *Cultural dimension*

The cultural dimension considers four impact fields: protecting and enhancing cultural heritage (assets), the intensity of cultural tourism development, the perception of visitors, and the perception of residents. Since the ETIS framework does not specifically focus on cultural tourism destinations, it is logical that within the core indicators, ETIS proposes less culture-specific impacts, only mentioning the protection and enhancement of cultural heritage. Within the SmartCulTour proposed indicators, use intensity and perceptions of visitors and locals in terms of attractiveness, protection, and benefits are added to the framework. Through the expert panel ten indicators are retained, only four of which were ultimately collected for the LAUs under investigation. These are outlined in Table 4.

[3] This impact field was not included in D4.1 after the phase of expert judgement, but is retained here due to its general significance in the literature.

As was the case in the economic dimension as well, the lack of information on site-level visitation and performance limits the opportunity to collect indicators on the intensity of cultural tourism development. While at a higher level visitor market studies across representative samples can give better indications on the share of culturally motivated visitors, it remains difficult to achieve such detail on the level of LAUs. While perception of visitors with regard to the conservation efforts at the destination was not considered a significant indicators by the expert panel, perceptions of residents were considered important and could be collected via resident surveys, although it would be impractical to conduct such surveys on annual basis.

**Table 4. Cultural indicators on LAU level**

| Impact field | Indicator | Retained at data collection |
|---|---|---|
| Protecting and enhancing cultural heritage (assets) | **Evidence of active participation of communities, groups and individuals in cultural policies and the definition of administrative measures integrating heritage (both tangible and intangible) and its safeguarding (Yes/No)** | **Yes** |
| | Number of heritage properties with a Management Plan including a formalized framework for community participation | No |
| | **Expenditure on cultural heritage by municipalities** | **Yes** |
| | Funding spent in restoration of historic buildings | No |
| | Specific measures to promote the participation of minorities and/or indigenous groups in cultural life (Yes/No) | No |
| Intensity of cultural tourism development | Number of visitors to cultural attractions/places (visitors/day) | No |
| | Number of visitors attending or participating in cultural events (participation/year) | No |
| | Share of visitors with a cultural motivation in total number of visitors | No |
| Perception of residents | **Percentage of the population that is very satisfied with cultural facilities in a destination** | **Yes** |
| | **Perceptions by the local population concerning the stimulation of local crafts and culture due to tourism** | **Yes** |

### *Social dimension*

Finally, the social dimension considers five impact fields: perception of visitors, perception of residents, tourism development intensity, inclusion/accessibility, and community outlook. While the perceptions which are included here are a novel addition to the ETIS framework, as well as the community outlook which includes information on stakeholder participation processes, the SmartCulTour proposal excludes the fields of health and safety, and gender equality. While those fields are undoubtedly important for general quality of life of local residents, the link between tourism is generally limited here in cultural tourism destinations and aspects such as gender equality and health and safety at the workplace would more readily be included in the economic dimension as indicative of the quality of employment, while perceptions on destination safety are part of that particular impact field. The expert panel retained eight social sustainability indicators, of which five were practically collected across the 35 LAUs.

Particularly for the social dimension, information on perceptions of residents is a necessity, requiring a more qualitative questionnaire which is increasingly becoming institutionalized at DMOs in the form of

resident surveys. Other traditional data pertains to broader ratios on tourism intensity, comparing tourist arrivals and overnight stays to the resident population. A limitation here is that these numbers generally cannot account for day tourists and might therefore underestimate tourism pressures.

**Table 5. Social indicators on LAU level**

| Impact field | Indicator | Retained at data collection |
|---|---|---|
| Perception of residents | **Perception of the local population regarding whether the life quality increases due to tourism** | **Yes** |
| | **Perception of the local population regarding whether the tourists have an undesirable effect on the local life style** | **Yes** |
| | **Perception of the local population regarding whether tourism contributes to improved public services** | **Yes** |
| Tourism development intensity | **Ratio of tourist arrivals on total permanent resident population** | **Yes** |
| | **Ratio of tourist nights on total permanent resident population (tourist intensity)** | **Yes** |
| | Seasonal percentage of non-resident employees in total number of tourism employees | No |
| Inclusion/ Accessibility | Percentage of accessible rooms | No |
| Community outlook | Degree of stakeholder participation in the planning process (low/medium/high) | No |

### 2.2.3. Individual measurements versus composite indicators

In the earlier analysis an initial assessment of +500 indicators was first trimmed down to 75 indicators and then via the suggestions of the expert panels brought to a total of 46 items, 21 of which could feasibly be collected at LAU level. While 21 indicators are sufficiently limited for a multi-dimension analysis and would not likely cause an information overload – unlike a spreadsheet of 75 indicators – there is often still policy preference for composite or synthetic indicators that are easily communicated to a wider audience for improved public understanding on the state and evolution of the destination (Blancas et al., 2015; Tanguay et al. 2013). In such an approach, the various indicators per sustainability dimension can then be recalculated in order to generate a single score per dimension – or alternatively a score per factor. Such a calculation requires decisions on normalization, relative importance of each indicator and on the methodological approach towards the summation (El Gibari et al., 2019), particularly when indicators are not calculated on the same basis (e.g. combining absolute numbers with percentages, ratios and dummy variables).

When indicators are scaled differently, for instance when combining numerical and categorical variables on different measurement units, normalization of data is needed in order to transform units of measurement into a single common scale. Normalization rescales a dataset so that each value falls between zero and one, commonly (although not uniquely[4]) via using the formula: $x_{new} = (x_i - x_{min}) / (x_{max} - x_{min})$ , where $x_i$ is the $i^{th}$ value in the dataset, and $x_{min}$ and $x_{max}$ are the minimum and maximum value in the dataset, respectively.

[4] For instance, D4.2 (Petrić et al., 2021) uses a slightly different version: the linear max-min method, which distinguishes between benefit and cost criteria, where benefit criteria (to be maximized) follow the given formula

Relative importance per indicator is based on assigning weights. As mentioned by Gan et al. (2017) and Singh et al. (2009) the easiest, and default, method would be to use equal weighting and thus not giving preference to any one indicator over others within a specific dimension/subdimension. It is advisable in cases where no theoretical background about the relative importance of indicators exists, since it does not require subjective choice and allows for easy interpretation. Another common technique is the use of statistical procedures such as explanatory or confirmatory factor analysis and base combinations on variance and covariance of data. Subjective weighting methods, on the other hand, use scoring, ranking or a variation of multicriteria decision making such as the analytical hierarchy process (Saaty, 1990). In general, since the concept of sustainable development already has defined dimensions and broadly established impact fields within each dimension, there is already some agreement on relative importance and categorization of variables, stating a case for subjective weighting methods to be used in composite indicator creation.

Finally, the normalized indicator scores are multiplied by their respective weights and then aggregated in a single composite score. This aggregation is most often done via simple additive weighting which is transparent and easily understandable for non-experts. While such composite scores are interesting for communication purposes, for management and planning of destinations, aggregation of indicators runs the risk of hiding decline in certain areas. Analysing composite indicators might suffice from a weak sustainability perspective and perfect substitution between capitals, but if true balance and a status-quo (or improvement) across individual indicators/impact fields is requested, composite indicators provide at best an incomplete overview and should be analysed prudently.

## 2.3. The influence of cultural tourism on sustainability and resilience

### 2.3.1. Cultural tourism development as a driver for positive change

One of the interests in developing cultural tourism – apart from its sizeable contribution to total tourism arrivals – is the perspective that cultural tourists are relatively more valuable and create lower impacts at the destination as compared to traditional forms of mass tourism. Timothy (2021) notes how decades of research have outlined general patterns in cultural tourism characteristics, with cultural tourists being on average higher educated, comparatively more affluent – thus spending more at the destination – and extending their stay at the destination. However, as already mentioned in D1.2 (Neuts et al., 2021) and also outlined by Juroswky et al. (2006), wellbeing improvements for host communities cannot be considered intrinsic to the development of cultural tourism and without proper attention given to sustainability, quality of life and the carrying capacity, cultural tourism can lead to similar excesses and negative impacts as alternative forms of tourism. Similarly, as noted by the Cultural Heritage Counts for Europe Consortium (2015, p.34) report, “there is a lack of comprehensive and readily available evidence for the benefits of cultural heritage on a European level”.

Therefore, more than chasing cultural tourism due to its suggested anecdotal benefits, or because of supply-side conveniences, relations between cultural tourism development and destination sustainability, resilience and general quality of life need to be empirically established.

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while cost criteria (to be minimized) follow the formula $x_{new} = (x_{max} - x_i) / (x_{max} - x_{min})$. This results in all new scores becoming benefit criteria, allowing for easy interpretation: a higher value is preferred.

The relationships to be tested can be visualized quite simply in Figure 3. The hypothesis is that cultural tourism development contributes positively to the four pillars of sustainability at the tourism destination, as well as increasing the economic resilience. In order to empirically assess the existence of such relationship, apart from 'tourism destination sustainability' – the indicators of which were discussed under heading 2.2.2, and in Tables 2, 3, 4, and 5 – 'cultural tourism development' and 'resilience' also need to be conceptualized and operationalized via the identification and collection of indicators. This is discussed next, after which heading 2.3.3 will outline statistical modelling procedures and findings.

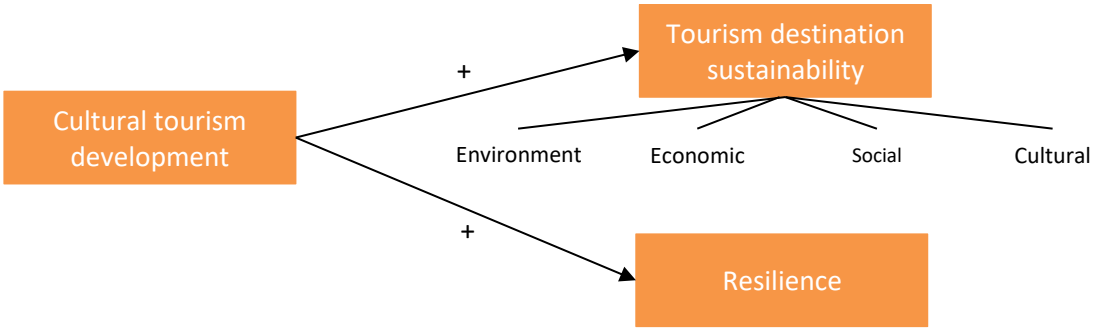


**Fig 3. Relationship between cultural tourism, sustainability and resilience**

### 2.3.2. Measuring cultural tourism development and resilience

***Indicators of cultural tourism development***

It can be operationally challenging to identify the level of cultural tourism development (as explanatory variable in Figure 3), as being conceptually uncorrelated to the cultural dimension of sustainability (which is part of the dependent variable). As noted by Wictor-Mach (2018), UNESCO has adopted three approaches to the role of culture in development: (a) culture as a dimension within sustainable destinations (e.g. see heading 2.2.2), (b) culture as a driver of sustainable development (as proposed in Figure 3), and (c) culture as an enabler of sustainability. Depending on the approach taken, cultural tourism indicators could thus be either part of a dedicated sustainability dimension or as an exogenous factor driving sustainability.

Petrić et al. (2020) solve this conundrum by framing it within the DPSIR (Drivers-Pressures-State-Impacts-Responses) framework whereby driving forces (e.g. economic sectors, activities, resources) generate pressures (e.g. emissions, tourism growth, crowding) onto resource states (e.g. water quality, air quality, vegetation), creating impacts on ecosystems (e.g. human health, environmental damage, biodiversity loss) which ultimately lead to responses (e.g. laws, policy measures). Indicators on cultural tourism development as a causal effect are then chosen to reflect drivers and responses, thus describing the actual level of development in the destination. Indicators related to pressures, state, and impacts, however, are allocated to the cultural dimension of sustainability and serve as dependent variable.

Similar to the conceptualization of sustainability dimensions, cultural tourism development is also multidimensional in nature, with a good example being provided in the Cultural and Creative Cities Monitor (CCCM) by Montalto et al. (2019) which collects 29 indicators across three sub-indices: cultural vibrancy, creative economy, and enabling environment. Alternatively, UNESCO (2019) offers recommendations on subdimensions in order to account for the multidimensional nature of cultural tourism, grouping 22

indicators into four thematic fields: (a) environment and resilience, (b) prosperity and livelihoods, (c) knowledge and skills, and (d) inclusion and participation.

SmartCulTour (Petrić et al., 2020) builds on these works, recognizing four dimensions and 11 subdimensions:

- Spatial indicators: (1) Presence of cultural resources (in absolute numbers), (2) Availability of cultural infrastructure;
- Prosperity and livelihood: (3) Cultural (tourism) businesses, (4) Employment, (5) Cultural governance – institutional framework, (6) Cultural governance – policies and financial framework; (7) Cultural tourism governance;
- Knowledge: (8) Cultural education; (9) Education in tourism management;
- Inclusion and participation: (10) Participatory processes; (11) Social cohesion.

Through review of the literature and mainly following UNESCO (2019), the European Commission (2016), and to a lesser extent Duran (2013) – in terms of tourism governance related indicators – 43 indicators are originally assigned to these 11 subdimensions, combining 26 quantitative indicators with 17 qualitative ones. Once again though, after assessing the practical possibilities of collecting these variables on the level of LAUs, just 27 indicators were retained for the final analysis, as shown in Table 6.

**Table 6. Cultural tourism development on LAU level – retained at data collection**

| Subdimensions | Indicator | Driver/ Response |
|---|---|---|
| **Spatial indicators** | | |
| Presence of cultural resources (in absolute numbers | Number of monuments in national lists | D |
| | Number of intangible cultural heritage objects in national lists | D |
| | Number of World Heritage Sites | D |
| | Number of elements inscribed on the UNESCO Intangible Cultural Heritage List | D |
| Availability of cultural infrastructure | Number of museums per 1000 inhabitants | D |
| | Number of theatres per 1000 inhabitants | D |
| | Number of public libraries per 1000 inhabitants | D |
| **Prosperity and livelihood** | | |
| Cultural (tourism) businesses | Number of cultural (and creative) enterprises | D |
| Employment | Number of cultural jobs per 1000 inhabitants | D |
| Cultural governance – institutional framework | Evidence of Ministry of Culture or a Culture secretariat with ministerial/directorial status at the state/national level (Yes/No) | R |
| | Evidence of local authority responsible for culture at local level (Yes/No) | R |
| | Evidence of a culture-based regulatory framework (Yes/No) | R |
| | Examples of initiatives designed through inter-ministerial cooperation to enhance culture's impact in other areas (tourism, education, communication, ICT, trade, international affairs, employment), such as regulatory frameworks, sector-specific laws, etc. | R |
| | Evidence for the use of DMOs to manage the impact of tourism on cultural values (Yes/No) | R |
| Cultural governance – policies and | Evidence of a cultural management plan or similar strategic document (Yes/No) | R |
| | Specific measures to support job creation in the culture and creative | R |

| | | |
|---|---|---|
| financial framework | sectors (Yes/No) | |
| | Specific measures to encourage the formalization and growth of micro/small and medium-sized cultural enterprises (Yes/No) | R |
| | Specific policy measures regulating public assistance and subsidies for the cultural sector (Yes/No) | R |
| | Specific policy measures dealing with the tax status of culture (tax exemptions and incentives designed to benefit the culture sector specifically, such as reduced VAT on books) (Yes/No) | R |
| | General government expenditure on culture per capita | R |
| Cultural tourism governance | Coordination, cooperation and collaboration among Public Tourism Administrations (PTAs) at different levels of government (regarding cultural tourism) (Yes/No) | R |
| | Establishment of cooperative and collaborative public-private relations (regarding cultural tourism), like sectoral associations of entrepreneurs and chambers of commerce (Yes/No) | R |
| | Cooperation and collaboration by public administrations with other nongovernmental actors and networks of actors (regarding cultural tourism) | R |
| | Evidence of cultural tourism strategic documents at local level (Yes/No) | R |
| **Inclusion and participation** | | |
| Participatory processes | Percentage of tourists that is very satisfied with cultural facilities in the destination | D |
| | Evidence of specific measures to promote active participation of communities, groups and individuals in cultural policies (Yes/No) | R |
| Social cohesion | Degree of positive assessment of gender equality | D |

***Resilience***

If earlier the concept of sustainability had been criticized for its sometimes limited practical applicability, much the same can be said of the notion of resilience. Originating in physics and mathematics and having a long history in the field of ecology, more recently, resilience has been co-opted by social sciences and is now used in a wide variety of disciplines. As a result, a clear definition is missing (Reid & Botterill, 2013). In its most historical sense, resilience is associated with the capacity of a material or system to return to an equilibrium state after disturbance or displacement (Norris et al., 2008). This original meaning is most closely followed in what is known as engineering resilience, with Holling (1973) defining it as the speed of recovery or return to the pre-disturbance position of a system. As an alternative conceptualization, ecological resilience is concerned with the capacity of systems to absorp, reorganize, and adapt to change while maintaining the same underlying function, structure and relationships between populations and states (Carpenter et al., 2001; Gunderson & Holling, 2002). While the notion of ecological resilience seems intuitively attractive, considering that it acknowledges ecosystems as fluid and constantly evolving and therefore focusing on reorganization and renewal processes, rather than on stable states, it is complicated by the fact that it is not clarified how much change is permitted in a system before it should be regarded as no longer having essentially the same structure (Martin & Sunley, 2015). This opened the door for yet another concept: adaptive (or evolutionary) resilience, which is defined as "the ability of the system to withstand either market or environmental shocks without losing the capacity to allocate resources efficiently" (Perrings, 2006, p.418).

Therefore, even though Petrić et al. (2021) mention that empirical literature on resilience is abundant, the lack of a common approach or consensus on the concept leads to several interpretations of regional

resilience. Faggian et al. (2018) and Hall et al. (2018) thus recommend that prior to any modelling taking place, three fundamental questions should be answered: (a) resilience "to what"? (b) resilience "of what"? and (c) resilience "over what period"?

In terms of the first question, "Resilience to what?", resilience has been adopted in disaster studies, economic downturns, recessions, terrorism, and pandemics with external shocks to the system therefore ranging from environmental disasters to economic downturns, acts of violence or disease. For any empirical analysis it is important to take into account a time horizon in which a shock can actually be observed. While currently the Covid-19 pandemic offers opportunities in terms of short-to middle-term reactions of systems, in the SmartCulTour project, the financial-economic crisis of 2008 was chosen as the external shock with the reaction measured across a longer time-series.

A second question to answer is "Resilience of what?" and thus requires a conceptualization of the system under study which relates both to the geographical area, the socio-economic system being analysed, and the indicators to represent this system. Clearly, the tourism destination as point of analysis is a multidimension and multifaceted complex system and resilience can pertain to tourism as well as non-tourism sector performance, political governance, social relationships, ecological resources, etc. Concerning the complexity, as well as data limitations faced particularly when adopting the analysis for LAUs, Romão's (2020) modified resilience indicator is adopted, only taking into account employment level change (relative change during pre-shock, shock and post-shock). While we acknowledge that this approach is a simplification of reality, Fagian et al. (2018) and Giannakis and Bruggeman (2019) stress the rationale of focusing on employment growth since employment typically reacts slower than changes in output and therefore better reflects the lag of the social impact during and after a crisis.

The final question on time-period for the analysis is directly linked to the question on "Resilience to what?". Depending on the type of shock that is to be empirically assessed, the time period has to be chosen in such a way that observations can be made for a long enough lag after the event – and preferably also before.

Finally it bears importance to mention the criticism of Cai (2020) on the traditional linear quantitative approaches towards the effect of shocks and mitigation circumstances towards improved resilience, to which the SmartCulTour analysis of D4.2 also falls victim: such analyses fail to take into account core values of resilience such as justice and inclusiveness. While the focus is on the speed of magnitude of a rebound effect, the notion of 'returning to normal' might be unwanted and instead a crisis might be used to assess and address systemic weaknesses and create innovative solutions. This seems particularly relevant in light of the Covid-19 aftermath and would require a more qualitative and normative assessment of the functioning of systems.

### 2.3.3. Identifying statistical relationships

In order to test for statistical relationships as outlined in Figure 3, a first decision needs to be made on the construction of factors (see the discussion on composite indicators under 2.2.3). Since 'cultural tourism development' as independent variable is multidimensional and was measured via 27 indicators, and 'tourism destination sustainability' comprised of four dimensions with a total of 21 indicators, simplifications are needed for modelling purposes. Given the relatively limited number of indicators per sustainability-pillar, and in order to simplify the analysis, it might be unnecessary to account for multiple subdimensions, and instead one score per sustainability dimension can be created (environmental sustainability index, economic sustainability index, social sustainability index, cultural sustainability index). These indices can then serve as dependent variable in four separate regression models. A similar approach

can be followed for resilience, although here no further transformation is needed since the resilience-concept was already measured via a single variable (employment change).

Since cultural tourism development acts as independent variable in both cases, it is statistically more convenient to allow for the identification of multiple factors here, thus potentially creating indices along the lines of the recognized subdimensions in Table 6. This would lead to a regression model with one of the four sustainability-pillars or the resilience-indicator as dependent variable, regressed on nine explanatory variables (i.e. the subdimensions of the cultural tourism development indicators). However, as noted by Petrić et al. (2021), in order to avoid a omitted variable bias, it is advisable to extend such regression models with other drivers of sustainability that have previously been identified in theoretical and empirical literature. Such control variables can be GDP per capita, population size, Worldwide Governance Indicators (WGI) – as a proxy for quality of governance – percentage of population with tertiary education, etc.

Suggested data analysis then depends on data availability. Ideally the combination of time series and cross-sections can support (dynamic) panel data analysis, where the time dimension can strengthen the robustness of the findings, as well as accounting for autocorrelation since current values of sustainability indices and resilience are logically related to their values in previous periods (Mazzola et al., 2019, Romão, 2020). If the dataset further expands regionally it should even be advised to also account for spatial autocorrelation and thus influences between neighbouring destinations. In reality, however, data is still largely missing on both temporal scale and on larger spatial scale. While a range of standard data as described in Tables 2 to 6 is structurally available on yearly basis, also for historical time periods, this is not always the case on local LAU level and is certainly not available for perception-related data requiring surveys. In reality, such surveys, as well as some other qualitatively inspired indicators, might only be available for a single time period. In such cases the only remaining possibility is to conduct a cross-sectional regression analysis for a single period.

In SmartCulTour D4.2 (Petrić et al., 2021) both panel data analysis (for environmental, economic, and social sustainability) and cross-sectional analysis (for cultural sustainability, and resilience) are used in order to identify possible effects of cultural tourism developments on the destination's sustainability and resilience. The interested reader can consult this deliverable for a detailed statistical analysis. As a general summary, it could be observed that cultural tourism development had a largely positive, yet somewhat mixed effect. The presence of cultural tourism resources (listed heritage sites and intangible cultural heritage) had a significant and positive impact across all sustainability-dimensions, as did the number of cultural and creative enterprises (with the exception of social sustainability, which was unaffected by the number of cultural businesses). These results provide evidence for the potential beneficial effects of cultural heritage resources on both prospective visitors and local residents. Interestingly, the presence of strong institutional governance had a positive effect on environmental and social sustainability indices, but a significantly negative impact on economic sustainability and resilience. This might suggest that such cultural policy regulatory framework and administrative support systems improve the protection of resources and help to manage impacts, at the potential expense of unbounded economic growth. Conversely, the factor measuring governance policies and financial frameworks (among other things: support for job creation, encouraging growth of SMEs, providing subsidies, etc.) significantly positively affected economic sustainability and resilience while having no noticeable effect on the other sustainability pillars. As a final policy-driven effect, the amount of cultural spending by local governments per capita had a logically positive effect on social sustainability and cultural sustainability. These results therefore seem to support the notion that cultural tourism development can be a source for good and a driver of sustainability and

resilience, but that local governance can influence these effects in different ways and act either as an instigator of economic growth, or as a prudent manager of impacts along environmental and social dimensions.

# 03 Decision support systems for destinations

## 3.1. Indicator integration and knowledge dissemination

While chapter 2 provided a discussion of cultural tourism development, sustainability – along four pillars – and resilience at the level of local tourism destinations (in our case, LAUs), both in terms of their indicator composition and in terms of their relationship, for destination management purposes it is unfeasible to collect and analyse a wide variety of indicators in a bare spreadsheet layout. As was identified by researchers, tourism boards, and international tourism organizations, development of indicators and metrics are of paramount importance (Önder et al., 2017). Castellani and Sala (2010) and Valentin and Spangenberg (2000) note how such sustainable tourism indicators serve at least three functions: (a) to facilitate the assessment of the effect of policies and practices on sector development, (b) to measure progress and develop strategies to guide progress towards a desired future, and (c) to communicate knowledge via the collection of quantitative and qualitative data on the tourism phenomenon on a particular geographical scale. Specifically relating to points (a) and (b) there is thus an apparent need for tools that can help to guide decision makers in evaluation and planning, particularly in light of the potential of negative impacts and the needs of the tourism industry to work towards greener and more sustainable initiatives (Aminu et al., 2013; Law et al., 2012). As noted by Font et al. (2021) it is important to look beyond the process of knowledge production and sharing and towards knowledge absorption, specifically with the aim of evidence-influenced policy making whereby evidence is maybe not the foundation of the policy process – as it is, somewhat unrealistically in evidence-based policy making – but one of the influencing factors.

Font et al. (2021) use the absorptive capacity (ACAP) concept to describe the learning process taking place at destinations (specifically DMOs), in particular the ability to identify, assimilate, and exploit new external knowledge. This can help to understand the potential of sustainability indicators to map the state of the destination and adapt policies according to recognized needs. Four aspects of data collection and interpretation capacity are considered:

- Acquisition: The first step in establishing the potential for absorptive capacity – and thus evidence-influenced policy making – is the identification and collection of relevant information. Much academic literature has focused on this step of sustainable tourism indicator creation, as was discussed in-depth in D4.1 (Petrić et al., 2020) and summarized earlier in this report. While many destinations are now collecting selections of indicators, the depth of data collection is still varied and some relevant data is difficult and expensive to gather, particularly when applied to lower-level administrative units.
- Assimilation: In this phase, information is interpreted and meaning is given to their respective states. This often requires setting sustainability thresholds, which is a contested process in itself (Blancas et al., 2011) and potentially open to external influences such as political agendas, experience and expertise, tradition, pressure groups, etc. (Sutcliffe and Court, 2005). In general, policy making is context sensitive and while indicators might predominantly collect objective information, the interpretation of such data does not simply amount to a technical problem-solving

exercise.

- Transformation and Exploitation: In order to realise absorptive capacity, the existing and newly acquired information should be merged and synthesized and transformed into knowledge (transformation) to create new products or services or improve policies and strategies (exploitation). As pointed out by Nutley et al. (2003), the ability – or willingness – of DMOs to transform and exploit knowledge can further depend on the extent to which information corresponds with current organisational structure and values. In terms of sustainability indicators, it would therefore depend at least partly on the integration of sustainable values within DMO practices and organizational KPIs.

## 3.2. From tourism dashboards to decision support systems

The first stage towards supporting absorptive capacity and evidence-influenced policy making (i.e. acquisition), was already discussed in chapter 2 of this report. Assimilation of data requires at minimum the combination of multidimension information. Dashboards are traditionally very popular ways of displaying such various types of data visually with the intent to convey different, but related information. They usually require no technical skills or prior understanding of data structures and allow for some flexibility in the type of visualization (tables, graphs, charts) and filtering of data (on geographical scope or timeframe).

While dashboards can be seen to support assimilation, transformation and exploitation as well, so-called decision support systems (DSS) are more specifically tailored to dealing with decision-making activities in rapidly changing and uncertain circumstances. According to Sprague (1980) a DSS: (a) tends to be aimed at less well-structured, not well-specified problems, (b) combines models or analytical techniques with traditional data provision, (c) should be useful for non-technical end users, and (d) emphasizes flexibility and adaptability to accommodate changes in the environment and decision-making approach of the user. Gachet and Haettenschwiler (2003) discuss differences in DSS according to the role of the user in the decision-making process. A passive DSS is then described as a system that aids the process of decision-making without explicitly providing suggestions and solutions. An active DSS, on the other hand, automates suggestions or solutions. A cooperative DSS establishes an iterative process between user and system whereby the decision maker can modify the suggestion provided by the system and sending it back for validation, starting a new cycle of improvement.

While the difference can be somewhat semantic, dashboards thus predominantly refer to more static systems that have a main goal to collect, combine, inform and disseminate. Examples of this in (tourism) destinations are for instance the Eurostat data and visualization tools, which are intended to structure data on a variety of topics around common definitions throughout the European Union. The indicators can provide a wealth of information but generally require the user to analyse, interpret and exploit according to their needs. Similarly, UNWTO's (n.d.) Tourism Data Dashboard provides general statistics on tourist arrivals, tourism share of exports and contribution to GDP, source markets, seasonality, number of rooms, guests and nights. These indicators can be interpreted by the users but the dashboard does not provide a priori strategic insights – and could not, considering the scope of the organization. A first step towards assimilation – in terms of assigning threshold values to indicators – can be observed here, with seasonality being mapped along four categories: low, medium, high, very high. More local DMO destination dashboards have a chance to further assign threshold values since their lower scale allows them to take into account local contexts and strategic plans. Examples of this approach are the Destination Barometer of Flanders (Toerisme Vlaanderen, n.d.) – where a selection of eight sustainability indicators are compared to threshold values in the form of traffic lights, as considered useful by tourism sector stakeholders (Font et

al., 2021) – and the 'state of the destination' dashboard of the Netherlands (Nederlands Bureau voor Toerisme & Congressen, n.d.) – which, rather than working with absolute threshold values, maps evolutions in sustainability indicators. In these local examples, dashboards still remain at the level of acquisition and assimilation, though, and the amount to which such indicators lead to transformation and exploitation will relate to how decision-makers interact with the data. In other words, the dashboards themselves do not provide suggestions, solutions or scenarios.

## 3.3. Integration of strategies and scenarios

As noted by Font et al. (2021), their workshop participants mentioned how dashboards or decision-support systems that have easy traffic light systems and can be used to compare destinations are important in order to motivate wider stakeholder networks and making them aware of the needs for change towards sustainability. This is corroborated by Önder et al. (2017) who describe the adoption of Data Envelopment Analysis (DEA) within TourMIS – an information system that compiles tourism statistics for European countries and cities – as an approach to benchmark urban tourism destinations. While the ability to benchmark destinations along sustainability performances is a popular application, there is a risk that such comparisons either lead to less performing regions deciding to drop out of voluntary or paid systems for political purposes (e.g. in the Global Destination Sustainability Index), or that it leads to a 'gaming' of the system and indicators in order to improve the profile of a destination. Furthermore, while comparisons can be useful to some extent, they fail to fully account for important contextual differences, so a qualitative assessment would always be required still.

While the integration of benchmarks is a first step towards transformation and exploitation, McGrath and More (2005) and Law et al. (2012) mention how change and dynamism are key concerns that need to be emphasized in a DSS, adopting the idea of system dynamics (SD) to model this. Within SD modelling, stocks, flows, and converters link the indicators in a DSS relationally and mathematically. Such a system can be used for both descriptive and predictive purposes since stocks and flows can be given either an actual value or a prospective/predictive value to simulate effects through the system. Law et al. (2012) give the example – as shown in Figure 4 – of the causal link between greenhouse gas emissions in the hotel sector, and market demand. As can be seen from the figure, even when just considering two main indicators with a rather clear cause-effect relationship, the model can quickly became prohibitively complicated.

Therefore, while theoretically attractive, the value of SD models are very reliant on the data architecture and the soundness of the statistical data and relationships. In reality, knowledge on the cause-effect relationships between individual variables in tourism development and sustainability is still largely missing – and often also non-linear and context-dependent – running the risk that SD models lead to oversimplifications with limited actual practical value in scenario analysis. Still, as pointed out by Jamal et al. (2004), the value of simulations and the forecasts they provide are subservient to the organizational learning process involved in developing, implementing and scenario testing of the model. Maani and Cavana (2000) note that SD models are now mature enough to have confidence in a three-step testing process of verification, validation, and legitimation, which is mainly concerned with ensuring that a model produces sensible results. SD modelling can be approached as an iterative process and, particularly within sustainable tourism development models, start small with only a few, relatively well-known, cause-effect relationships.

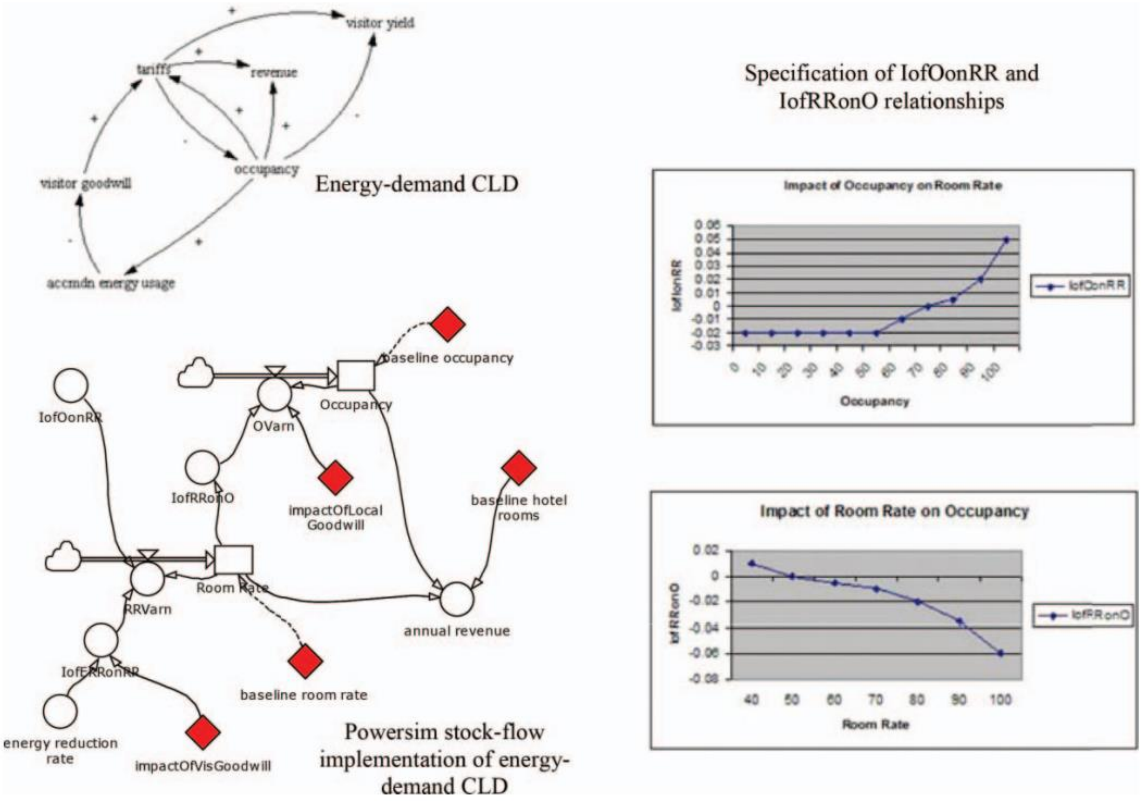


**Fig 4. An example of system dynamics modelling (Law et al., 2012, p.835)**

## 3.4. Balancing complexity and simplicity

Clearly, the more an indicator visualization method moves towards a dynamic DSS with the inclusion of benchmarks, causal links, feedback loops, forecasting and scenario analysis, the higher the complexity of the system. This creates a risk of information overload, particularly since a sustainable tourism destination DSS should ideally cater to a wide range of heterogeneous stakeholders. Such stakeholders will have different data needs depending on the geographical scope of their activities, their role within the tourism system, their primary goals and strategies, their organizational structure (public, private, non-profit), etc. Mylod and Lee (2022) suggest five steps to deal with information overload: (1) segmentation of the data's consumers, (2) determining how (and which) data can create value for each type of consumer, (3) integration of data to generate more insights, (4) establishing priorities, and (5) providing information in the format most helpful to its users.

Such an approach might, however, necessitate the creation of a separate DSS per type of stakeholder, which would be inefficient and impractical since it can lead to data redundancy and inconsistency if the information architecture is not set up correctly. A more efficient solution would be to allow the flexibility to be integrated in the DSS design. Firstly, a DSS can conveniently be split into a more limited 'insights'-type page, where a number of pre-selected priority indicators are collected and visualized for all stakeholders. For many stakeholders, such insights will already suffice for their needs and they might not require any deeper, more complex analysis. For the interested, more experienced user, a second layer can be provided with a flexible, modular widget-design. An example of such widget-design is found in the SmartCulTour Platform, as presented in D5.2 (Bertocchi et al., 2021a). As mentioned by these authors in terms of the DSS architecture: "widgets allow to promptly connect to the plethora of data sources made available via data

visualization. In this way, users are able to control the flow of information and to actively mould it according to their individual needs. Additionally, thanks to their integration within the DSS highly interactive layout, users are able to add, zoom in, and delete widgets at will, thereby creating their own preferred interface" (Bertocchi et al., 2021b, p.3). By furthermore allowing users to save their preferences, different stakeholders can thus, in effect, create their own visualizations, omitting irrelevant variables and segmenting the data and format according to their own priorities.

# 04 Policy recommendations

From the work delivered so far in the SmartCulTour project under WP4 and WP5, the following policy recommendations are considered. These recommendations are linked to the conceptualization and operationalization – via individual and composite indicators – of sustainable tourism destinations, as well as identifying the potential driving force of cultural tourism development on destination sustainability (across all pillars) and resilience. A second part of the policy recommendations focuses on the visualization and dissemination aspect and discusses use and opportunities of decision support systems to support policy making and general tourism destination management.

**Table 7. Policy recommendations**

| Dimension/ Subject | Recommendations |
|---|---|
| Indicator selection and collection for sustainable tourism destinations | ▪ A robust core set of sustainability indicators should be relatively fixed, preferably in line with extensive earlier work performed as part of the European Tourism Indicator System (ETIS), supporting destinations in the collection and integration in data systems.<br>▪ Only when indicators are unequivocally considered and collected, can longitudinal datasets be established. Both longer timeframes and geographical diverse data should be collected in order to integrate longitudinal and spatial effects. Issues still remain in the ecological and social impact field, specifically in terms of identifying the specific contribution of tourism. Furthermore, if indicators are to have policy implications, there needs to be a considerably faster data acquisition since many indicators are now collected with time lags of one to two years. Integration of open data standards is an important aspect of such process and should be further supported.<br>▪ While stakeholder integration in indicator selection aligns with a generally preferred participative/cooperative approach, it would be advisable to only include a wider range of stakeholders after pre-determining important indicators, using stakeholders as a platform to help to trim down a pre-selection rather than to establish completely new and diverse indicators. |
| Establishing empirical links between cultural tourism, sustainability, and resilience | ▪ In order to properly identify empirical relationships, tourism development indicators, sustainability indicators and the resilience concept all need to be sufficiently uncorrelated and measured continuously. This also requires the adoption of generally accepted definitions and measurement approaches, which is largely still lacking – particularly within the 'resilience' concept, thus risking it being used purely as a buzzword.<br>▪ Resilience – as a preferred destination characteristic – should also be studied qualitatively in order to investigate potential necessary changes in unsustainable systems, rather than just measuring a bounce back to a potentially unwarranted |

| | |
|---|---|
| | status-quo. |
| Supporting the development of modular Decision support systems | ▪ Decision support systems for destination management should not just visualize static data but should be designed to integrate scenario analysis and cause-effect modelling (for instance within a 'digital twins' systems). While detailed data for tourism systems is currently still largely missing, an iterative process can start for more straightforward indicator relationships that can be gradually expanded when more knowledge becomes available.<br>▪ An underlying architecture for tourism decision support systems should ideally be provided on EU level, allowing individual destinations to upload data and use the system with limited cost. Within such system, a widget style architecture is advisable in order to avoid information overload and make decision support systems broadly useful for a wide range of actors. |

## 4.1. Indicator selection and collection for sustainable tourism destinations

### 4.1.1. Adopting a communal core set of sustainability indicators

As indicated in SmartCulTour D4.1 (Petrić, 2020), there is a substantial amount of research on sustainability indicators, performed within academic institutions, governmental departments, NGOs, and intergovernmental organizations. An initial screening of the literature yielded hundreds of reports, ultimately culminating in over 500 uniquely identified indicators across three generally considered dimensions – environmental, economic, social – and sometimes extended with an institutional, technical and/or cultural sustainability pillar[5]. Ko (2005) stresses the importance for individual destinations to choose their own relevant sustainability indicators in order to account for local context, however this leads to lack of communality and meaningful comparisons. Furthermore, as argued by Tanguay et al. (2013), while local – additional – indicators can be considered, there should be a minimum consistency in core indicators in order to avoid situations where sustainability is being manipulated for marketing efforts, or where important indicators are omitted as a result of local policy objectives.

Önder et al. (2017) recognize the work done by various organizations into the development of alternative sets of sustainability indicators, including the European Environment Agency, UNEP, United Nations Development Program and The World Bank, UNWTO and the European Commission. These various proposals generally feature significant overlaps in objectives – and some base indicators – but also include certain peculiarities in terms of recommended indicators. In particular, the European Tourism Indicator System (ETIS) culminated out of a multi-year cooperation between the European Commission and the Tourism Sustainability Group, composed of public and private sector exports in sustainable tourism, and was tested across over 100 destinations across Europe. ETIS recognizes 43 core indicators that would ideally be regularly monitored, although a destination can use its discretion to choose the relevant indicators – from the core set – to monitor in order to meet local needs. In order to provide further

[5] In cases where studies are limited to a conceptualization along three traditional pillars (environmental, economic, social), it can be noted that indicators related to culture are often included within the social dimension, so while a separate treatment of culture in a dedicated sustainability dimension can serve to highlight the importance of culture within tourism development – as well as recognizing potential positive and negative impacts – in a practical sense there should not be a distinct difference in selected indicators.

flexibility, ETIS foresees an opportunity to consider supplementary indicators adding to the basic information and tailor a system to local needs depending on destination characteristics (e.g. mountain, urban, rural, coastal, islands) (European Commission, 2016). This answers the needs of, for instance, Choi and Sirakaya (2006) on dedicated community tourism indicators, and Önder et al. (2017) who mention a lack of sustainability indicators relevant for city tourism. Within ETIS, such dedicated indicators could be added within a more generalized framework, without leading to completely new frameworks.

Font et al. (2021), in their analysis on the impact of ETIS on destination competitiveness and integrated sustainability thinking, see the main value of ETIS primarily in its awareness-raising role to prioritize data collection – and less in the 43 specific indicators, with a number of ETIS-related publications highlighting shortcoming in indicator applicability or definitions. However, given the broad nature of the sustainability concept itself, any indicator selection is bound to be criticized to some extent, leading to a situation where much effort is spent on continuously redefining and refining indicators, often with narrow focus on destination peculiarities or tourist typologies. As such, much redundancy is being created in the conceptual and operational phase while progress in practical data collection is being hampered. It is therefore advisable to use the foundations of ETIS in further EU-funded research projects on sustainable tourism, rather than subsidize yet another slightly adjusted alternative indicator set.

### 4.1.2. Supporting data collection, establishing tourism's role in impacts, and increasing speed of data availability via open data standards

Defining sustainability dimensions, impacts and indicators is only a first step. Naturally these indicators are intended to be monitored over time and place in order to evaluate performance and assist management processes. As noted by Font et al. (2021), completeness and comparability of tourism data related to sustainability and competitiveness is still poor and becomes even more critical on lower administrative levels (NUTS2 and NUTS3). There are important regional differences in terms of the amount of data that is available through national statistical agencies and in most cases economic data is more readily available than data on environmental and social impacts (Modica et al., 2018), particularly if these impacts need to be assigned specifically to the tourism sector. The latter is an important problem when considering many of the environmental impact indicators. E.g. while $CO_2$ emissions, energy consumption, or waste production are more readily available on the level of a destination, these numbers are generally totalled for the administrative unit or, at most, distinguish broadly between industry, services and households. Additional studies are needed here in order to establish rule-of-thumb strategies[6] when lacking actual data. For instance, given a large enough dataset, panel data analysis could be used to regress monthly total waste production on LAU level on population, tourist overnight stays, and other relevant indicators in order to identify potentially useful coefficients.

A second current limitation in the policy making potential of sustainability indicators is time gap that often exists in data collection. It is quite common for official statistical data to be updated one to even two years after date. Quite clearly, such delay leads to a situation where data can at most serve for historical reporting but not for real-time or short term policy making. Increasingly automated data collection systems as well as use of open data standards can gradually improve this situation. However, currently there is still a lack of open data strategies in many DMOs and official statistical agencies. An important improvement here

[6] E.g. in environmental footprint analysis it is common practice to adopt impact factors that can be multiplied with tourist arrivals/overnights of various tourist typologies. While obviously less exact than actual supply-side measurements, it can temporarily provide a solution to important data gaps.

should be found in the Open Standards for Linked Organisations (OSLO) initiative that aims to achieve standardization for the exchange of data by facilitating and recognizing semantic and technical data standards, including the triple helix of government, industry, and academia.

### 4.1.3. Participative stakeholder integration for indicator trimming, not indicator pre-selection

Within many administrations, community participation has become an integral part of the policy toolkit and one can argue that such community integration is the ultimate goal of a democratic society. Since sustainability of the tourist destination potentially involves a wide range of public and private stakeholders (both within and outside of the tourism sector), UNWTO's (2004) handbook on the development of sustainable tourism indicators describes the participatory planning process as the second step – right after the choice of destination for which indicators are being developed. However, the manual itself already recognizes that not all forms of participation are equal, that a participatory process is time-consuming, complex, and unpredictable, and that it cannot be presumed that all types of stakeholders are equally willing to become involved. As such, there are important risks involved when following a bottom-up process of indicator development. The process can be hijacked by strong lobby groups with a vested interest and thus lack counterweight voices of less involved stakeholder groups. In such cases, indicator selection becomes largely subjective and might serve to protect a status-quo and/or omit important sustainability dimensions and indicators. More benign but still somewhat problematic is the slow process at which conceptualization and operationalization then takes place, as well as the risk of not sufficiently building on foundations of earlier scientific research, thus culminating in indicators that might be very case-specific and miss larger comparability across destinations.

Therefore, as advised by Tanguay et al. (2013) and the European Commission (2016) in the ETIS toolkit, while stakeholder integration is important in order to generate awareness, understanding, assistance in data collection, and to link indicators with the policy framework, the participative approach is better served to select indicators from a pre-determined set. Therefore, in a first stage destinations should rely on expert judgements and available indicator frameworks in order to design more universal and multidimension indicator sets. ETIS discusses the role of the formation of a Stakeholder Working Group in this regard, although as observed by Romagosa and Sirse (2016) within the ETIS pilots there was an observable difference in interest between public and private sector, as well as numerous inactive Stakeholder Working Group members. It remains a challenge to fully incorporate the private sector in sustainable destination management frameworks that have a predominant macro perspective. In terms of stakeholder integration it is also important to note the role being played by other governmental agencies tangentially related with tourism. Important aspects that are intrinsic to the tourism sector, such as culture, nature, and mobility often fall under the authority of different departments.

## 4.2. Establishing empirical links between cultural tourism, sustainability, and resilience

### 4.2.1. Adoption of generally accepted definitions and continuous indicator measurement

A central tenet for the support of cultural tourism in destinations is its beneficial influence on sustainable destination development and resilience. Such positive effect is often implied by the general patterns in cultural tourism characteristics that suggest cultural tourists are, on average, higher educated, comparatively more affluent, and stay longer at the destination – thus potentially having a deeper local experience (Timothy, 2021). However, the sheer size of cultural tourism, as well the heterogeneity among cultural tourists, can lead to similar excesses and negative impacts as other tourist types associated with mass tourism. As noted by the Cultural Heritage Counts for Europe Consortium (2015, p.34) report, "there is a lack of comprehensive and readily available evidence for the benefits of cultural heritage on a European level". While various studies, often focusing on specific destinations, typologies, and types of impacts, have identified both positive and negative effects (e.g. Altman & Finlayson, 1993; Fusco Girard & Nijkamp, 2009; Wallace & Russell, 2004), there is still a lack of more general foundational empirical research.

As proposed in SmartCulTour D4.2 (Petrić et al., 2021), such studies rely on measurable concepts in order to statistically validate relationships. This has proven challenging since, apart from the varied nature of sustainable destination development indicators, distinguishing between cultural tourism development as a driver, and cultural sustainability as an effect (and part of the wider sustainability concept) is challenging. Wictor-Mach (2018), notes how UNESCO, for instance, adopts three approaches to the role of culture in development: (a) culture as a pillar of sustainability, (b) culture as a driver of sustainable development, and (c) culture as an enabler of sustainability. Depending on the approach, operationalization of cultural tourism as an activity and cultural sustainability as a destination state via indicators could therefore lead to strong correlations. This is problematic since it would lead to a self-fulfilling prophecy whereby the activity supports sustainability merely because the indicators used are indistinguishable.

It is therefore advisable to follow Petrić et al.'s (2020) approach by framing indicators within a DPSIR (Drivers-Pressures-State-Impacts-Responses) framework whereby indicators on cultural tourism development as a causal effect are chosen to reflect drivers and responses – describing the actual level of development in the destination – while indicators related to pressures, state, and impacts are allocated to the cultural dimension of sustainability and serve as dependent variable. Once again, similar to the need for a communal set of tourism sustainability indicators (see heading 4.1.1), this calls for a need to share a communal set of variables identifying the state of cultural tourism at the destination. Table 6 in this report – reflecting SmartCulTour D4.1 Petrić et al. (2020) – provides a suggestion in this regarding, building further on the works of UNESCO (2019), the European Commission (2016), and to a lesser extent Duran (2013).

Similarly, more recently there has been an increased interest in the effects of (cultural) tourism on regional resilience, studying both tourism's resilience towards external shocks as the potential contribution of tourism specialization in creating a more resilient destination (Dogru et al., 2019; Hall et al., 2018; Romão, 2020). However, while sustainability is sometimes criticized for its lack of conceptual clarity, much the same can be said of resilience, which has been co-opted by social sciences from its original conception in physics, mathematics and later ecology (Reid & Botterill, 2013). As noted by Faggian et al. (2018) and Hall et al. (2018), three fundamental questions should be answered for practical purposes: (a) resilience "to what"? (b) resilience "of what"? and (c) resilience "over what period"? Rather than adopting resilience as a buzzword, research should clarify clearly which type of systemic shock is being analysed and what part of

the tourism system is being investigated in terms of its reaction to this shock. In most practical analyses, the outcome variable will very often be simplified to GDP per capita or employment[7].

### 4.2.2. Both quantitative and qualitative approaches needed to study resilience of destinations

As was already mentioned in heading 4.2.1 and also discussed under 2.3.2, resilience is a complex concept that cannot be readily transposed onto social sciences research. Comparing the two major conceptualizations, the engineering approach defines resilience as the speed of recovery or return to the pre-disturbance position of a system after experiencing an external shock (Holling, 1973), while the ecological aproach defines resilience as the capacity of systems to absorp, reorganize, and adapt to change while maintaining the same underlying function, structure and relationships between populations and states (Carpenter et al., 2001; Gunderson & Holling, 2002).

In quantitative research, the most common application then studies aftershock effects within the tourism sector (e.g. due to terrorist attacks, environmental disasters, financial crises) with pre-crisis employment (or another type of indicator) providing the equilibrium benchmark. The level of resilience can then refer to the timespan before a destination recovers up unto the benchmark equilibrium again, or alternatively a lower but continuous growth path can be identified. However, Cai (2020) provides a valid criticism on such traditional linear quantitative approaches: by focusing on the speed of magnitude of a rebound effect, the notion of 'returning to normal' is not questioned. However, the pre-crisis equilibrium might have been unsustainable and instead a crisis might be used to assess and address systemic weaknesses and create innovative solutions, instead of attempting a quick recovery.

Therefore, while quantitative research towards the effect of tourism on the resilience of destinations, and the resilience of the sector itself to external shocks is valuable – since tourism is an important contributor to employment and socio-economic quality of life – quantitative studies should ideally be supplemented with a more qualitative and normative assessment of the functioning of systems. This is particularly relevant in light of the Covid-19 aftermath whereby early optimism regarding a 'built back better' approach and greening of the tourism industry already seems to have been surpassed by a 'business as usual' reality.

## 4.3. Supporting the development of modular decision support systems

### 4.3.1. Integration of systems dynamics for scenario analysis and cause-effect modelling

In order for indicators to not only be collected on continuous basis, but also lead to knowledge building and evidence-influenced policy making, visualization of complex and multidimension data into attractive and user-friendly decision support systems is necessary. While there are multiple examples of dashboards with a wide variety of data but a more limited flexibility (such as the data presented by Eurostat and UNWTO's

[7] It is also worthwhile to consider whether studies can then truly claim to measure resilience, which is an inherently complex and multidimensional concept. Because in such cases, operationalization amounts to traditional economic performance indicators.

Tourism Data Dashboard), Font et al. (2021) and Önder et al. (2017) mention a strong interest in also providing benchmarking and traffic light systems for sustainability threshold values. At the same time, there is a risk involved in destination benchmarking since comparisons can lead to a loss of participation by less performing regions (where participation is voluntary), or a 'gaming' of the system in order to improve the profile of a destination.

While benchmarking is a relatively widely adopted practice – that can still be improved if more destinations follow similar indicator collection frameworks – McGrath and More (2005) and Law et al. (2012) mention a more complex addition to decision support systems in order to improve exploitation and policy making: adopting the principle of system dynamics (SD) in order to model change and dynamism. Simply speaking, a SD model links the indicators in a DSS via mathematical cause-effect equations. This can be used for both descriptive as predictive purposes since indicators can be assigned either true values or prospective/predictive values in order to simulate development scenarios. The advantage of this is intuitively clear: it would allow destinations to tweak indicator values and simulate the effects of multiple policies and scenarios on the sustainability of the destination. However, the theoretical attractivity is inhibited by the practical complexities of developing the model. SD models rely on the quality of data and the proper understanding of relationships between indicators. In practice there is still a dearth of knowledge on the cause-effect relationships between individual variables within a wider tourism system. Therefore, while the potential benefits are significant, it is prudent to experiment with a few relatively stable cause-effect relationships and expand the model in iterative fashion through verification, validation and legitimation (Maani and Cavana, 2000). Gradually, when more research becomes available on the links between cultural tourism development and different sustainability indicators – as was part of the research done in SmartCulTour D4.2 (Petrić et al., 2021) – a more robust decision support system with strong policy supporting functionality can be created.

### 4.3.2. Provision of general underlying data architecture at higher level

As mentioned by Font et al. (2021), the implementation of the ETIS toolkit has not been further supported by the European Commission after the two pilot phases and as a result only a handful of destinations are currently still collecting the ETIS-inspired indicators. In a majority of destinations some form of indicator collection occurs, linked to local data availability and policy objectives, with many destinations also producing their own dashboards. While some notable initiatives for data integration across levels exist (e.g. the TourMIS system and the collection of sustainable destination indicators among its members by the European Travel Commission), in general many DMOs still work rather individually. At the same time, Font et al. (2021) remark how the pilot destinations in ETIS were strongly advocating for an extension of the European-led Virtual Tourism Observatory, to serve as a platform for the collection, visualization and benchmarking of ETIS indicators.

A European-wide tourism decision support system would therefore be beneficial and has also been recognized by the Council of the European Union, noting how "The council of the European Union invites the Commission to work with the Member States and relevant international organizations to jointly design an EU Tourism Dashboard, as an EU flagship tool for the tourism ecosystem." (Council of the European Union, 2021, p.9). Particularly in light of the need to accelerate a green and digital transition, an expansive decision support system that monitors the sustainable development of the tourism ecosystem is essential.

Since decision support systems at higher administrative levels require local inputs for data population, there could be a distinction between the responsibility to provide the data architecture and the

responsibility to provide data. One of the limitations of destination management in smaller administrative regions is often the lack of available funds. A database architecture could be envisioned whereby a technical decision support system is prepared to which users (local tourism destinations) can upload the local data – preferably ETIS-inspired indicators – in a structured data format and receive automated visualization. The visual design could ideally follow a modular widget style architecture that allows for full user flexibility in the control of the flow of information in order to avoid information overload and make decision support systems broadly useful for a wide range of actors.

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